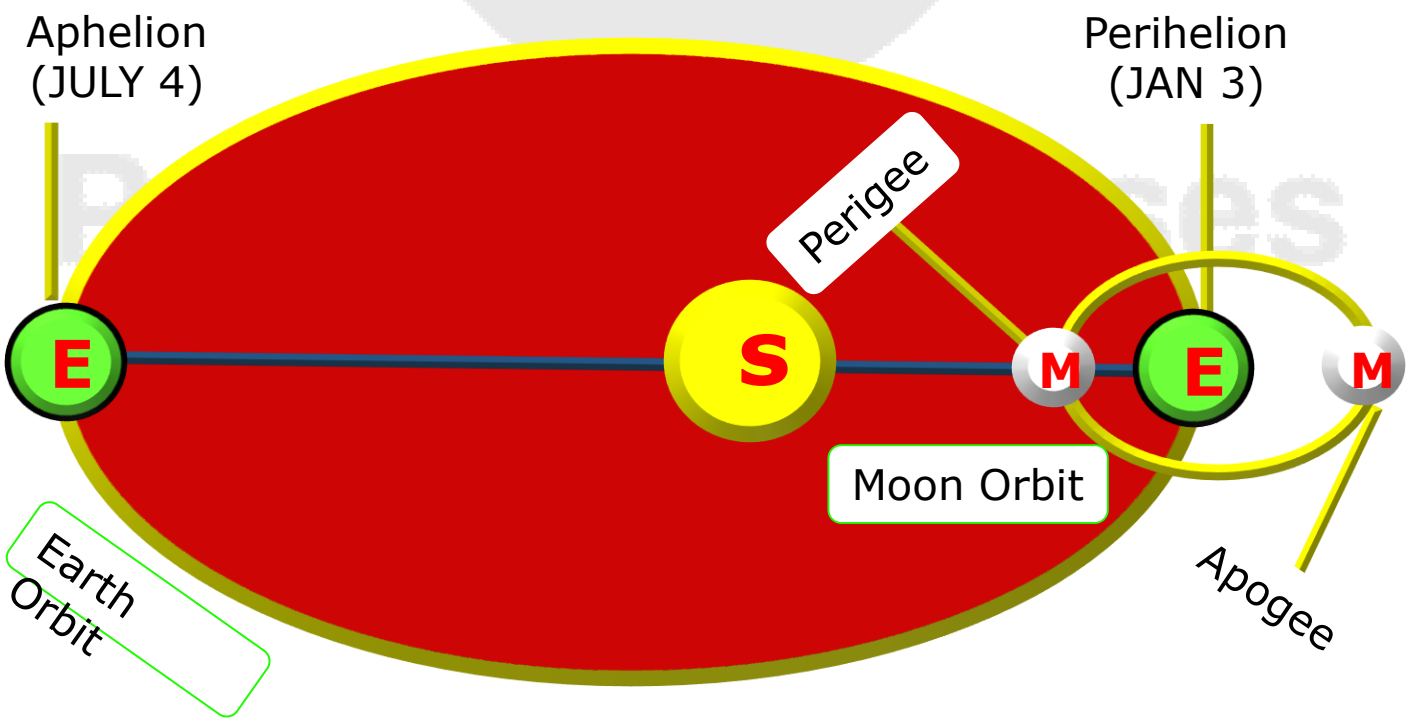
THE EARTH

Parcham Classes

About the Planet

- The Earth is the third planet from the Sun.
- Planet Type – Terrestrial
- Earth is the biggest of the terrestrial planets, and the fifth largest planet overall.
- The Earth is called the **Blue Planet**.
- It is densest of all the planets.
- Density : 5.52 gm/cm^3
- Diameter : 12,756 km
- Circumference : 40075 km
- Surface Area : 5.1 x 10^8 km^2
- Distance from the Sun : 149 * 10^6 km
- Perihelion : 147 * 10^6 km (minimum distance)
- Apihelion : 152 * 10^6 km (maximum distance)
- Date of perihelion : January 3
- Date of aphelion : July 4
- Shape : Geoid or Oblate Spheroid Shaped, i.e, almost spherical, flattened a little at the poles with a slight bulge at centre (shaped like a tangerine or orange).



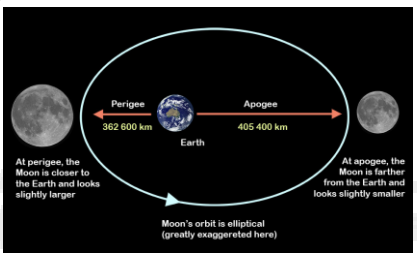
- Escape Velocity : 11.2 km/second
- Mass : 5.972 x 10^{24} kg
- Highest Point : Mount Everest (8848 m)
- Lowest Point in Ocean : Challenger Deep in Mariana Trench in Pacific Ocean (10924 m deep)
- Lowest Point on land : Dead Sea (396 m deep)
- Time taken by the light of the sun to reach Earth: 8 min 18 sec.

Moon

- It is the only natural satellite of the planet Earth.
- It is the fifth largest natural satellite in the Solar System.
- The Moon's distance from Earth is about 385,000 km.
- The Moon has a solid, rocky surface.
- The Moon has a very thin and tenuous atmosphere called an exosphere. It is not breathable.
- Rotational time: 27 days 7 hours 43 min 11.47 sec
- Our Moon doesn't shine, sunlight illuminates the Moon.

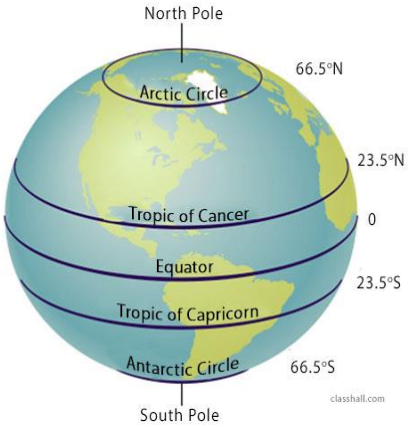
Perigee and Apogee

- The point in the Moon's orbit that is closest to the Earth is called the perigee and the point farthest from the Earth is known as the apogee. The terms are also sometimes used interchangeably with the Earth's perihelion and aphelion.
- The Moon's distance from Earth is about 385,000 km.
- Perigee distance : approx. 364000 km.
- Apogee distance : approx. 406000 km.



Latitudes

- These are imaginary lines drawn parallel to the equator.
- If the latitude are drawn at an interval of 1 degree, then in each of the hemispheres there will be 89 latitude lines that will add up to 179 total lines. These are also called Parallels.
- One degree latitude = Approx. 111 km.

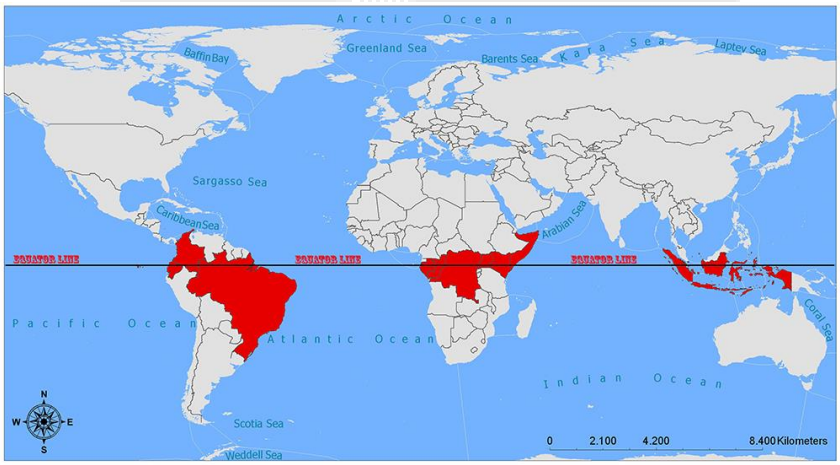


- Equator
- Equator is the imaginary line that divides the earth into two hemispheres.
- The northern hemisphere and the Southern hemisphere.
- It is the longest line of latitude.
- The Equator covers 40075km out of which 78.8% covers the water area while 21.3% covers the surface area.

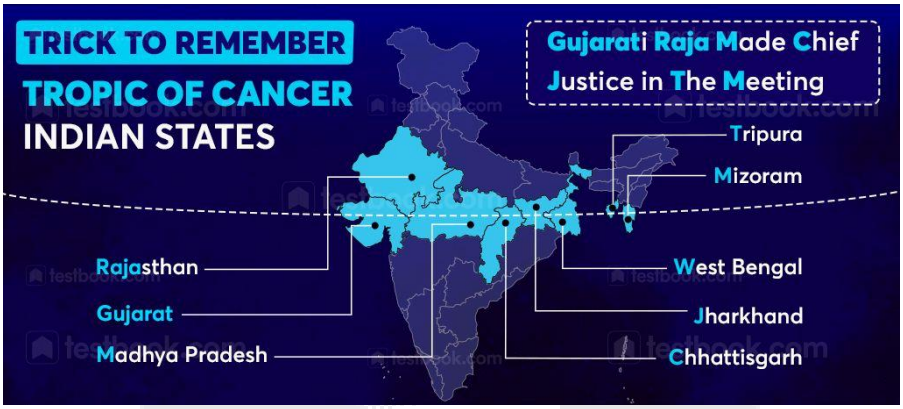
The important latitudes are :-

1. Equator (0°) – greatest circle (Divides the Earth into Northern and Southern Hemispheres)
2. Tropic of Cancer (23½° N),
3. Tropic of Capricorn (23½° S),
4. Arctic Circle (66½° N),
5. Antarctic Circle (66½° S),
6. The North Pole (90° N),
7. The South Pole (90° S).

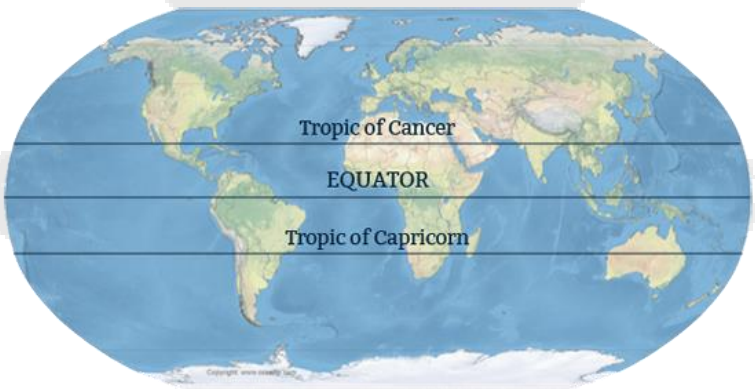
The Equator passes through 13 countries: Ecuador, Colombia, Brazil, Sao Tome & Principe, Gabon, Republic of the Congo, Democratic Republic of the Congo, Uganda, Kenya, Somalia, Maldives, Indonesia and Kiribati.



- Countries that the Tropic of Cancer passes through There are 16 countries, 3 continents and 6 water bodies through which the Tropic of Cancer passes.
- North America Bahamas (Archipelago), Mexico
- Africa Egypt, Libya, Niger, Algeria, Mali, Western Sahara, Mauritania
- Asia Taiwan, China, Myanmar, Bangladesh, India, Oman, United Arab Emirates, Saudi Arabia
- Water Bodies: Indian Ocean, Atlantic Ocean, Pacific Ocean, Taiwan Strait, Red Sea, Gulf of Mexico

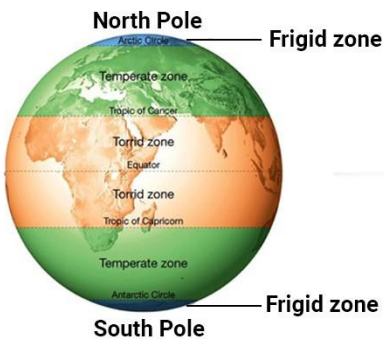


- Countries that the Tropic of Capricorn passes through There are 10 countries, 3 continents and 3 water bodies through which the Tropic of Capricorn passes.
- South America Argentina, Brazil, Chile, Paraguay
- Africa Namibia, Botswana, South Africa, Mozambique, Madagascar
- Australia
- Water Bodies: Indian Ocean, Atlantic Ocean, Pacific Ocean



Geographical Zones on Earth

- Torrid Zones
- The Torrid Zone lies between Tropic of Cancer and Tropic of Capricorn and is called Tropics.
- In this zone the sun passes directly overhead seasonally.
- Hence it experiences the maximum heat once in a year.



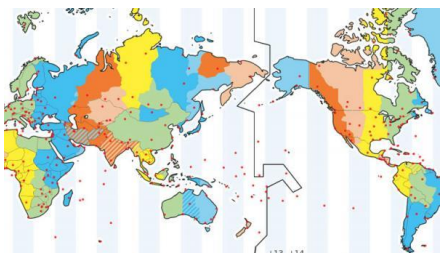
- Frigid Zones
- There are two frigid zones- North Frigid Zone and the South Frigid Zone.
- The North zone lies between North Pole (90-degree) and Arctic Circle whereas the South zone is between South Pole (90-degree) and Antarctic Circle.
- These zones experience the midnight sun and polar night for the part of the year and are the coldest regions on Earth.

- Temperate Zones
- Again there are two temperate zones- North Zone lying between Arctic Circle and Tropic of Cancer, South Zone lying between Antarctic Circle and Tropic of Capricorn.
- Due to the tepid latitudes Sun rays never fall directly which results in mild weather.
- Therefore, these zones experience all four seasons: summer, spring, autumn and winter.

Longitudes

- These are imaginary lines drawn as a series of semicircles that extend from the north pole to the south pole through equator.
- These are also called Meridians.
- There are total 360 longitudes.
- They are equal in length.
- They form great half circles.
- They cross the equator at right angles.

Longitudes

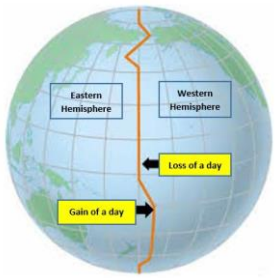


- 0 °Longitude is called the Prime or First Meridian.
- Opposite to 0 °there is 180 °longitude, which is called the International Date Line.
- The Prime Meridian & the International Date Line forms a circle and divides the Earth into Eastern and Western Hemispheres.
- The Prime Meridian and the International Date Line are opposite to each other. Such opposite points are called Antipodal Points.
- The Prime Meridian passes through Royal Astronomical Observatory at Greenwich near London.
- The International Date Line passes through Pacific Ocean.

- Eastern Hemisphere
- It is the east of the Prime Meridian that covers the country like Africa, Asia, Europe, Australia, and the islands of Oceania.
- The landmass of the Eastern Hemisphere is larger than the western part. Therefore, 80% of the human population survives in the Eastern Hemisphere.
- Eastern Hemisphere is also termed as Oriental Hemisphere.
- Western Hemisphere
- It is the west of the Prime Meridian that covers North and South America and some parts of Africa, Europe, Antarctica, and also Asia.
- The center of the Western Hemisphere is at the Pacific Ocean whose nearest land is Genovesa Island.

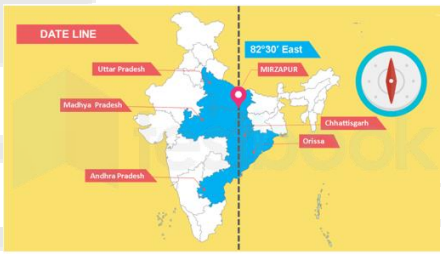
Date Line

That line passes the Bering Strait between Alaska and Siberia, which thus have different dates, but for most of its course it runs in mid-ocean and does not inconvenience any local time keeping.



Indian Standard Time (IST)

IST is based on longitude 82.5°, which passes through Mirzapur, near Allahabad in Uttar Pradesh. It is 5 hours 30 minutes ahead of Greenwich Mean Time (GMT), now called the Universal Coordinated Time (UTC)



➢ There is a difference of exactly 24 hours on the East and West of the Int. date line.

Basic calculation

- ➢ Total number of Longitudes : 360
- ➢ Total time in a day : 24 hours
- ➢ Total Longitudes covered in an hours = $\frac{360}{24}$ = 15 longitudes
- ➢ Each longitude takes = $\frac{1}{15}$ hours = $\frac{1}{15}$ x 60 = 4 min.
- ➢ G.M.T (Greenwich meantime) =0^0
  - ➢ I.S.T (Indian Standard time) = $82\frac{1}{2}^0$
- ➢ Difference of time =82.5 x 4 = 330 min or 5 hours 30 min.

Practice Question

If the difference in time between two places were 2 hours and 20 minutes, then the difference in their longitude would be:

A. 30 **B.** 35

C. 45 **D.** 50

Seasons

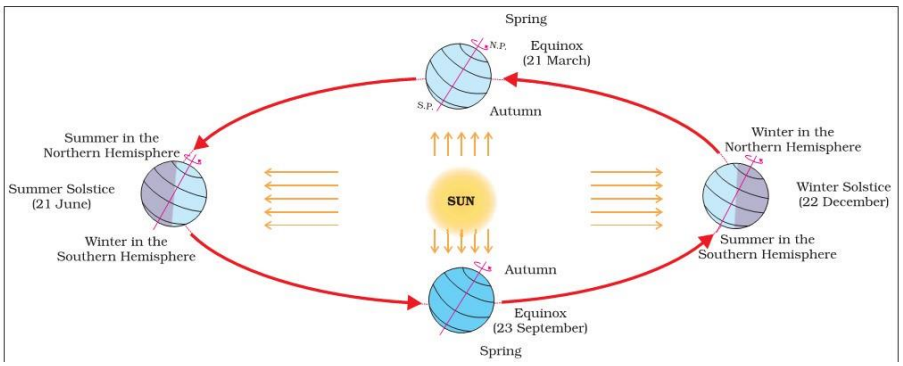
- The four seasons are :

1. Spring
2. Summer
3. Autumn
4. Winter

- Northern hemisphere Spring = Southern hemisphere Autumn.
- Northern hemisphere Autumn = Southern hemisphere Spring.
- Northern hemisphere Summer = Southern hemisphere Winter.
- Northern hemisphere Winter = Southern hemisphere Summer.

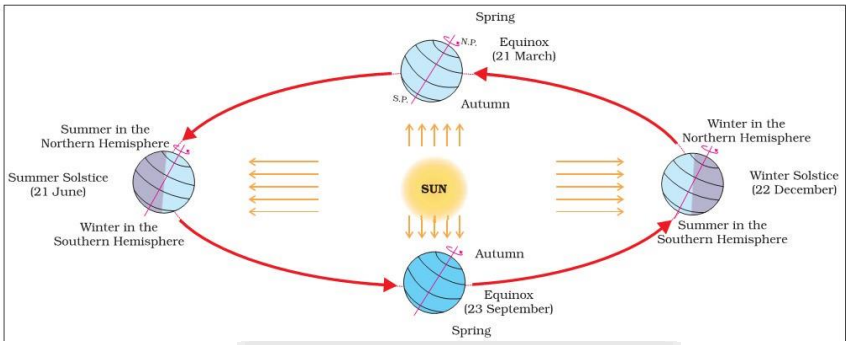
Spring

- On March 21, the sun is directly overhead the Equator.
- From this day, Spring starts in Northern hemisphere.
- Autumn starts in Southern hemisphere.



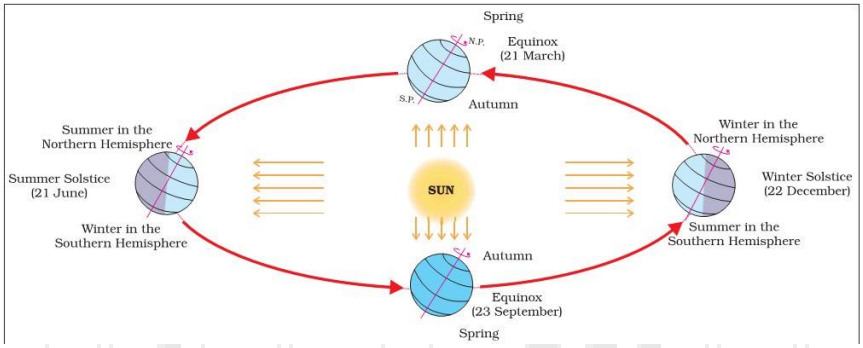
Summer

- On June 21, the Sun is directly overhead the Tropic of Cancer.
- From this day, Summer starts in Northern hemisphere.
- Winter starts in Southern hemisphere.



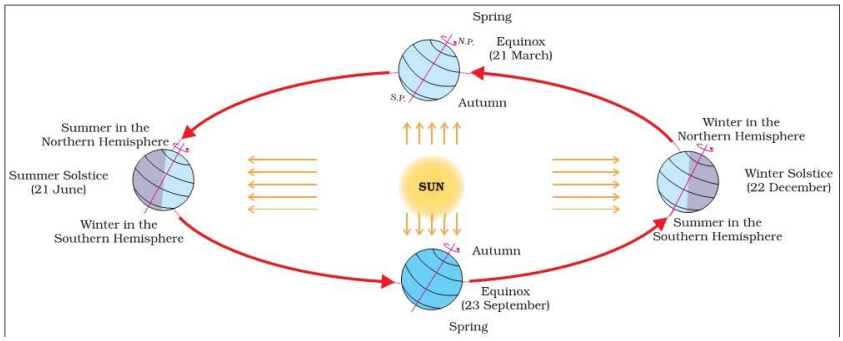
Autumn

- On September 23, the Sun is again overhead the Equator.
- From this day, Autumn starts in Northern hemisphere.
- Spring starts in Southern hemisphere.



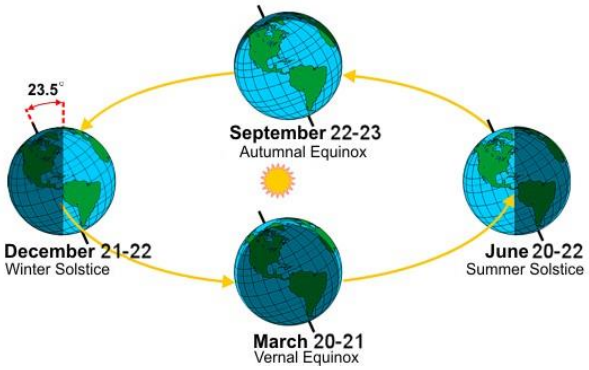
Winter

- On December 22, the Sun is overhead the Tropic of Capricorn.
- From this day, Winter starts in Northern hemisphere.
- Summer starts in Southern hemisphere.



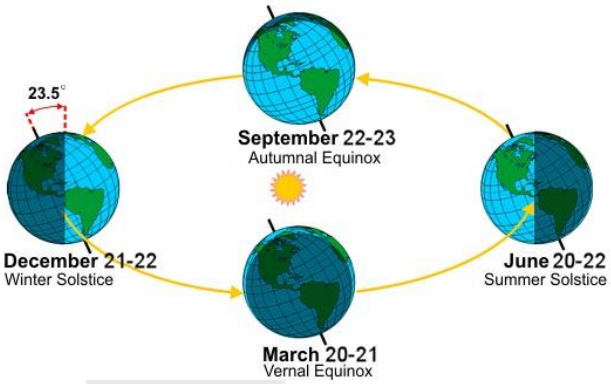
Equinoxes

- Equinoxes are dates when the days and nights are of equal length.
- During these days, the sun shines directly over the equator.
- This occurs twice each year, on **21st March (Vernal or spring equinox)** and **23rd September (Autumnal equinox).**



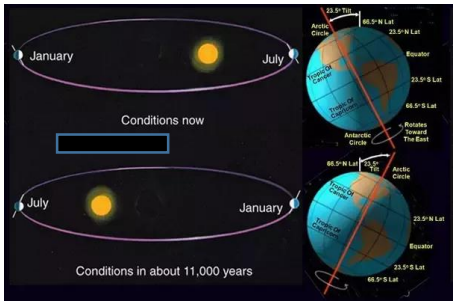
Solstice

- Solstices are the time of the year when the difference between the length of the days and nights are the largest.
- During these days the sun shines directly over the tropics.
- On **21st June**, Sun is direct overhead on Tropic of Cancer, it is the Longest Day in Northern hemisphere. This day is called the **Summer Solstice**.
- On this day, the Southern Hemisphere experiences the smallest night.



- On **22nd December**, Sun is direct overhead on Tropic of Capricorn, it is the Longest Day in Southern hemisphere. This day is called the **Winter Solstice.**
- On this day, the Northern Hemisphere experiences the smallest night.

Midnight Sun



- It is a phenomenon , observable in the latitudes 66.5° North and South (the Arctic and Antarctic circles) where the sun does not sink below the horizon during summer.
- This results due to the tilt of Earth's axis.
- Each hemisphere being inclined towards the sun during its summer, experiences this.
- North Pole experiences day from 21st March to 23rd September.
- South Pole experiences day from 23rd September to 21st March.

Question

Every country calculates its Standard meridian as the angular distance from the Greenwich meridian.If it is12 noon at GMT what is the time on Indian Standard Time?

a) 5:30 P.M

b) 5:00 P.M

c) 5:20 P.M

d 5:30 A.M

- Explanation:

As we know Earth rotates 360 ° in 24 hours,

Per hour earth will cover (360/24) 15°degrees.

Therefore,

15 degree= 1 hour and

1 degree = 4 minutes

Now according to the given problem , we know while moving east from Greenwich the time increases So difference between GMT and IST(82.5 degree)= 82.5-0 is 82.5 degrees

And 1 degree =1/15 hours

So 82.5 degree= 1/15 X 82.5=5.5

That is 5 and a half hour ahead. So, 5:30 P.M

The mid-day sun is exactly overhead at least once a year on all latitudes in between the Tropic of Cancer and the Tropic of Capricorn this area is called as _____.

[A] Torrid Zone

[B] Temperate Zones

[C] Frigid Zones

[D] None of these

Which is the base of the World's Standard Time?

Prime Meridian

Tropic of Cancer

Tropic of Capricorn

Equator

Options:

(a) 1

(b) 3

(c) 2

(d) 4

Arctic and Antarctic Circles are the frigid zones of Earth.

The parallel of lines are the parallel circles from the Poles to the Equator

The Equator is an imaginary line that is the base of time and is the longest latitude.

The location of any place on the Earth can be identified from the latitudes only.

Options:

(a) 1

(b) 2

(c) 4 and 3

(d) All the above statements are correct.

Question	Answer
1	A
2	A
3	A
4	A